

	<p>RMTH300 – Practical Math</p> <p>Master Course Syllabus</p>
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## Course Overview (QM Standards 1.2)

**Course description:** The course covers contemporary topics and shows the power of mathematics by presenting applied math concepts in fields such as manufacturing and distribution, finance, technology and sustainable growth. This course, designed for non-math majors, does not require a prohibitive amount of prerequisite mathematical knowledge (i.e. Calculus or other upper level mathematics). The focus is on the practical side of mathematics used in the real world. Topics to be covered include: Graph Theory, Management Science, Identification Numbers, Transmitting Information and Cryptography, and Geometric Growth.

### Course Goals:

1. Identify and define key mathematical terminology.
2. Apply mathematical concepts to model, analyze or solve real-world problems.

## Pre-Requisites (QM Standard 1.6)

There are no course prerequisites for this course other than being an RBA (Regents Bachelor of Arts) student.

## Minimum Technical Requirements and Online Resources (QM Standards 1.5 & 1.7)

In addition to a web browser (preferable Firefox) that is Blackboard compatible, you will need the other WVROCKS supported technologies outlined in the student policies section.

**Online Resources:** This course makes use of many online resources. I have made every effort to make sure the links I have are up-to-date. However, due to the changing nature of the web, you may find that a resource is temporarily unavailable or has been removed. If this should happen, please send me an email and I will find an alternative resource or modify the assignment accordingly.

## Instructor Information (QM Standards 1.8 & 5.3)

Individual instructors complete this information.

### **Virtual Office Hours**

I am available in my virtual office by appointment only. Send me an email to set up an appointment.

### **Personal Commitment**

My personal commitments to you as a participant include:

- I will reply to course mail messages within 24 hours;
- I will read all discussion postings and will reply where appropriate within 3 days
- I will acknowledge my receipt of every course mail message immediately upon reading it. If I am unable to respond to the request or concern at the time of initial reply, I will give you an estimated time for my next reply.
- If I am going to be away from the course space for more than a day or two, I will send a message to you indicating the length of my absence.
- I will regularly update information regarding due dates in the course announcements.

### **Optional/Required Course Materials (QM Standard 4.6)**

You will find your required textbook information in the course catalog at <http://ilearn-wvrocks.wvnet.edu>. All other materials are found in the individual course modules.

### **Grading Policy (QM Standard 3.2)**

#### **Evaluation and Grading**

Each module consists of a series of assignments, worksheets, discussions and reviews, each having specific point values designated in the table below. For each assignment you will be given the rubric or grading criteria from which you will be evaluated.

The grading scale is as follows:

- A = 351-390 pts.
- B = 312-350 pts.
- C = 273-311 pts.
- D = 234-272 pts.
- F = < 234 pts.

## List of Course Assignments with Point Values

Assignment/Assessment	Point Value
Orientation Assignment	5
Orientation Discussion	5
Learner Responsibilities Quiz	0
M1A1: Defining and Using Key Terms Electronic Worksheet	10
M1A2: Modeling Problems with Graph Theory Electronic Worksheet	10
M1A3: Finding Euler Circuits and Using Euler Circuits to Solve Problems Electronic Worksheet	10
M2A1: Defining and Using Key Terms Hamiltonian Graphs and Trees Electronic Worksheet	10
M2A2: Applying Hamiltonian Circuits Electronic Worksheet	10
M2A3: Applying Trees to Find Optimal Solutions Electronic Worksheet	10
M2A4: Applying Graph Theory to Minimize Costs to Real-world Situations Writing Assignment	30
M2A5: Discussion: Discussing Real-World Applications of Graph Theory	10
M3A1: Defining and Using Key Mathematical Terms Electronic Worksheet	10
M3A2: Planning and Scheduling real-world Situations Case Studies.	20
M4A1: Concept Check on Gantt Charts Electronic Worksheet	10
M4A2: Applying Planning and Scheduling Ideas to Minimize a Real-world Problem Writing Assignment	30
M4A3: Discussion: Discussing Real-World Applications of Planning Tools	10
M5A1: Defining and Using Key Terms Related to Identification Numbers Electronic Worksheet	10
M5A2: Explaining Ways that Data is Encoded Writing Assignment	30
M6A1: Data Encoding and Error Checking Electronic Worksheet	10
M6A2: Cryptography Uses in the Real-world Case Study	20
M7A1: Defining and Using Key Terms Related to Geometric Growth for Savings Electronic Worksheet	10
M7A2: Applying Concepts to Setting up a Retirement or College Fund Case Study	20
M8A1: Defining and Using Key Terms Related to Geometric Growth Models in Borrowing Electronic Worksheet	10
M8A2: Computing Compound Interest in Borrowing Writing Assignment	30
M8A3: Discussion: Discussing Home Mortgages	10
M8A4: Final Poster OR Video	50
<b>Total Points</b>	<b>390</b>

## Module Objectives and Assessments (QM Standard 2.2, 2.3, 2.4, 2.5, 3.4, 3.5, 5.1)

### Module 1: Management Science-Urban Services

After you have complete the readings and content for this module you will be able to:

- Identify and define key Graph Theory terms.[**M1A1: Defining and Using Key Terms Electronic Worksheet**]
- Model street networks using graphs.[**M1A2: Modeling Problems with Graph Theory Electronic Worksheet, M1A3: Finding Euler Circuits and Using Euler Circuits to Solve Problems Electronic Worksheet**]
- Determine if a graph has an Euler Circuit.[**M1A2: Modeling Problems with Graph Theory Electronic Worksheet , M1A3: Finding Euler Circuits and Using Euler Circuits to Solve Problems Electronic Worksheet**]
- Solve problems by applying Eulerization to graphs. [**M1A2: Modeling Problems with Graph Theory Electronic Worksheet , M1A3: Finding Euler Circuits and Using Euler Circuits to Solve Problems Electronic Worksheet**]
- Apply Euler circuit concepts to suggest a method to improve the planning of routes for a local department in your community.[**M1A2: Modeling Problems with Graph Theory Electronic Worksheet, M1A3: Finding Euler Circuits and Using Euler Circuits to Solve Problems Electronic Worksheet**]

### Module 2: Management Science – Business Efficiency

After you have complete the readings and content for this module you will be able to:

- Identify and define key Graph Theory terms. [**M2A1: Defining and Using Key Terms Hamiltonian Graphs and Trees Electronic Worksheet**]
- Model travel situations with graphs. [**M2A1: Defining and Using Key Terms Hamiltonian Graphs and Trees Electronic Worksheet**]
- Find optimal solutions by applying minimum-cost Hamiltonian circuits. [**M2A2: Applying Hamiltonian Circuits Electronic Worksheet, M2A4: Applying Graph Theory to Minimize Costs to Real-world Situations Writing Assignment, M2A5: Discussion: Discussing Real-World Applications of Graph Theory**]
- Apply Hamiltonian circuit concepts to improve the planning of routes for a business. [**M2A2: Applying Hamiltonian Circuits Assignment, M2A4: Applying Graph Theory to Minimize Costs to Real-world Situations Writing Assignment, M2A5: Discussion: Discussing Real-World Applications of Graph Theory**]
- Model real-world situations with weighted trees.[**M2A3: Applying Trees to Find Optimal Solutions Electronic Worksheet**]
- Find optimal solutions by applying minimum-cost spanning trees.[**M2A3: Applying Trees to Find Optimal Solutions Electronic Worksheet**]
- Apply minimum spanning tree concepts minimize costs in a real-world situation.[**M2A3: Applying Trees to Find Optimal Solutions Electronic Worksheet**]

### **Module 3: Management Science – Planning and Scheduling**

After you have complete the readings and content for this module you will be able to:

- Define key mathematical terms. [M3A1: Defining and Using Key Mathematical Terms Electronic Worksheet]
- Develop planning and scheduling models for given situations. [M3A2: Planning and Scheduling Real-World Situations Case Studies]

### **Module 4: Management Science – Developing a Gantt Chart**

After you have complete the readings and content for this module you will be able to:

- Find best solutions to planning and scheduling problems that are related to your job or your home life. [M4A2: Applying Planning and Scheduling Ideas to Minimize a Real-world Problem Writing Assignment, M4A3: Discussion: Discussing Real-world Applications of Planning Tool]
- Set up Gantt chart for a real-world scheduling problem. [M4A1: Concept Check on Gantt Charts Electronic Worksheet]

### **Module 5: The Digital Revolution – Identification Numbers**

After you have complete the readings and content for this module you will be able to:

- Recognize key identification number schemes. [M5A1: Defining and Using Key Terms Related to Identification Numbers Electronic Worksheet]
- Recognize key ways your personal data is encoded: Social Security, Driver's License, Passport Number, etc. [M5A2: Explaining Ways Data is Encoded Writing Assignment]

### **Module 6: Digital Revolution – Information Science**

After you have complete the readings and content for this module you will be able to:

- Describe how information is encoded to be stored by a computer and sent between devices, such as computers or cell phones. [M6A2: Cryptography Uses in the Real-world Case Study]
- Describe how encoded data is checked for accuracy and decoded. [M6A1: Data Encoding and Error Checking Electronic Worksheet]
- Apply encoding and decoding schemes to given messages. [M6A1: Data Encoding and Error Checking Electronic Worksheet]
- Use check digit schemes to find errors in transmitted information. [M6A1: Data Encoding and Error Checking Electronic Worksheet]

## **Module 7: Your Money and Resources – Saving Models**

After you have complete the readings and content for this module you will be able to:

- Identify and define key terms in geometric growth for savings. [**M7A1: Defining and using Key Terms Related to Geometric Growth for Savings Electronic Worksheet**]
- Use geometric growth models to compute savings for several scenarios using compound interest. [**M7A1: Defining and Using Key Terms Related to Geometric Growth for Savings Electronic Worksheet**]
- Create a savings plan for a children’s college fund or for retirement. [**M7A2: Applying Concepts to Setting up a Retirement or College Fund Case Study**]

## **Module 8: You Money and Resources – Borrowing Models**

After you have complete the readings and content for this module you will be able to:

- Identify and use key terms related to geometric growth models in borrowing. [**M8A1: Defining and Using Key Terms Related to Geometric Growth Models in Borrowing Electronic Worksheet**]
- Use geometric growth models to compute borrowing for several scenarios using compound interest. [**M8A2: Computing Compound Interest in Borrowing Writing Assignment**]
- Analyze models for car loans and home mortgages. [**M8A3: Discussion – Discussing Home Mortgages**]
- Final: Interpret the usefulness of a mathematical concept to your personal life. [**M8A4: Final Poster or Video**]